

CLAIM AMENDMENTS

The following listing of the claims replaces all previous claims, versions and listings thereof.

Claim 1 (Currently amended): A process for removing mercaptans from a fluid stream comprising mercaptans and further acidic gases, [especially] CO₂ and/or H₂S, which comprises

[intimately] removing at least one mercaptan from the fluid stream by contacting the fluid stream in an absorption or extraction zone with a scrubbing liquor comprising:

at least one tertiary aliphatic alkanolamine of [2] 3 - 12 carbon atoms, and
from 0.5 to 15% by weight of at least one activator selected from the group
consisting of saturated 5-membered heterocycle, saturated 6-membered heterocycle, and a
mixture thereof, wherein each heterocycle may optionally additionally contain a further
heteroatom selected from the group consisting of nitrogen and oxygen;

wherein the amount of scrubbing liquor being supplied to the absorption or extraction zone [being] is sufficient to remove at least CO₂ and H₂S essentially completely from the fluid stream, to form a composition comprising a substantially decontaminated fluid stream a
a loaded scrubbing liquor;

[and] separating the substantially decontaminated [lean] fluid stream [and] from the [loaden] loaded scrubbing liquor;

and discharging [them] the substantially decontaminated fluid stream and loaded
scrubbing liquor from the absorption or extraction zone.

Claim 2 (Original): A process as claimed in claim 1, wherein the scrubbing liquor contains an excess of the aliphatic alkanolamine, based on the acidic gases to be removed.

Claim 3 (Previously Amended): A process as claimed in claim 1, wherein the scrubbing liquor contains not more than 5% by weight of a physical solvent for mercaptans.

Claim 4 (Previously Amended): A process as claimed in claim 1, wherein the tertiary alkanolamine used is methyldiethanolamine.

Claim 5 (Currently Amended): A process as claimed in claim 1, wherein the [scrubbing liquor contains as] activator[, a primary or secondary alkanolamine or] is a saturated [5- or] 6-membered N-heterocycle which optionally contains further heteroatoms selected from the group consisting of oxygen and nitrogen.

Claims 6-7: (Canceled).

Claim 8 (Currently Amended): A process as claimed in ~~claim 7~~ claim 1, wherein the activator is selected from the group consisting of monoethanolamine, monomethylethanolamine, diethanolamine, piperazine, methylpiperazine and morpholine.

Claim 9 (Currently Amended): The [use as] process claimed in ~~claim 7~~ claim 1, wherein the activator is piperazine or methylpiperazine.

Claims 10-12: (Canceled).

Claim 13 (Currently Amended): A method process as claimed in ~~claim 12~~ claim 1, wherein the mixture scrubbing liquor contains from 10 to 70% by weight of methyldiethanolamine, from 0.5 to 15% by weight of piperazine, and water.

Claim 14 (New): The process as claimed in claim 1, wherein the activator is a saturated 5-membered N-heterocycle which optionally contains further heteroatoms selected from the group consisting of oxygen and nitrogen.

Claim 15 (New). A process as claimed in Claim 1, wherein the amount of scrubbing liquor supplied to the absorption or extraction zone is sufficient to lower the CO₂ level to not more than 500 ppm and the H₂S level to not more than 10 ppm.

Claim 16 (New). A process as claimed in Claim 1, wherein the amount of scrubbing liquor supplied to the absorption or extraction zone is sufficient to lower the CO₂ level to not more than 50 ppm and the H₂S level to not more than 4 ppm.

Claim 17 (New). The process claimed in claim 1, wherein the activator is piperazine.

Claim 18 (New). The process claimed in claim 1, wherein the activator is methylpiperazine.

Claim 19 (New). The process claimed in claim 1, wherein the activator is morpholine.

Claim 20 (New). The process claimed in claim 1, wherein fluid stream is selected from the group consisting of hydrocarbon gas, natural gas, synthesis gas, heavy oil, heavy residues, refinery gas, liquid hydrocarbon and liquefied petroleum gas.

Claim 21 (New). The process claimed in claim 1, wherein fluid stream is a gaseous or liquid hydrocarbon stream.

Claim 22 (New). The process claimed in claim 1, wherein the scrubbing liquor does not contain cyclotetramethylene sulfone, aliphatic acid amide, NMP, N-alkylated pyrrolidones, methanol, alkyl ether polyethylene glycol or dialkyl ether of polyethylene glycol.

Claim 23 (New). The process claimed in claim 1, wherein the loaded scrubbing liquor contains less than 1% by weight of hydrocarbons.

Claim 24 (New). The process claimed in claim 1, wherein the loaded scrubbing liquor contains less than 0.3% by weight of hydrocarbons.

Claim 25 (New). The process claimed in claim 1, wherein the loaded scrubbing liquor comprises from 3 to 8% by weight of piperazine.

BASIS FOR THE AMENDMENTS

Claim 1 has been amended to remove the objectionable, "especially" and "preferably" language. Claim 1 has also been amended to positively recite removing at least one mercaptan; to recite a tertiary aliphatic alkanolamine; and to specify the type and amount of activator. Support for these amendments is found in the claims and specification as originally filed.

Claim 5 has been amended in view of the amendments to claim 1, which finds support in the claim as originally filed.

Claims 6 and 7 have been canceled.

Claim 8 has been amended in view of the amendments to claim 1, which finds support in the claim as originally filed.

Claim 9 has been amended to correct a typographical error and in view of the cancellation of claim 7. These amendments find support in the claims as originally filed.

Claims 10-12 have been canceled.

Claim 13 has been amended for clarity and in view of the cancellation of claim 12. These amendments find support in the original claims.

New Claims 14-25 have been added, and these are drawn to narrower and more preferred embodiments of the invention.

New Claim 14 finds support at Claim 5 as originally filed.

New Claims 15-16 find support at the last paragraph on page 6.

New Claims 17-18 find support at Claim 8 as originally filed.

New Claim 20 finds support at page 1, lines 4-8.

New Claim 21 finds support at page 5, lines 30-32.

New Claim 22 finds support at the first paragraph on page 6.

New Claims 23-24 find support at the first paragraph on page 7.

Application No. 10/019,313
Reply to Office Action of June 2, 2003

New Claim 25 finds support at page 8, lines 26-37.

No new matter is believed to be added by entry of the amendments and, as such, entry and favorable consideration are kindly requested. Upon entry of the amendments, Claims 1-5, 8-9 and 13-25 will be active and in condition for allowance.